Interstate Pollution Control / Roto Rooter Superfund Site
Rockford, Illinois
Engineered Barrier Installation
Construction Specifications

PERFORMING PARTY:

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Date: September 12, 2006

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PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. General

1. Project consists of the construction of an Engineered Barrier (Barrier) over the Site. The Barrier will be comprised of a flexible membrane liner, with an overlaying asphalt surface. From top to bottom, the barrier will generally consist of a nominal 8-inch thick asphalt pavement, underlain by 12 inches of granular base course, a 40 mil thick HDPE flexible membrane liner (FML) and a geotextile layer over the grading layer.
2. Work By Others:

    a. Site clearing and grubbing.
    b. Monitoring well installation

1.2 DEFINITIONS

A. Construction Quality Assurance Consultant (QA Consultant) - Party, independent from Installer that is responsible for observing and documenting activities related to quality assurance during the lining system construction. The QA Consultant for this project is Patrick Engineering (Patrick).

B. Engineer- SECOR International Incorporated (SECOR).

C. FML Manufacturer (Manufacturer) - The party responsible for manufacturing the FML rolls. The Manufacturer is GSE Lining Technology, Inc. (GSE).

D. FML, Geotextile Installer- Party responsible for field handling, transporting, storing, deploying the FML and Geotextile and seaming and testing of the FML seams. The Installer is Clean Air and Water Systems.

E. Panel- Unit area of a FML that will be seamed in the field that is larger than 100 ft^2.

F. Patch- Unit area of a FML that will be seamed in the field that is less than 100 ft^2.

G. Subgrade Surface- Soil layer surface which immediately underlies the geosynthetic material(s).

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01100

PART 1 - GENERAL

1.1 GENERAL COORDINATION

A. Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to:

1. Preparation of Contractor's construction schedule.
2. Installation and removal of temporary facilities and controls.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Pre-installation conferences.
6. Project closeout activities.

1.2 PROJECT MEETINGS

A. General: Attend scheduled meetings and conferences at Site, unless otherwise indicated.

B. Preconstruction Conference: Attend a preconstruction conference before starting construction, at a time convenient to Performing Party and Engineer, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Performing Party, Engineer and their consultants; Contractor and its superintendent; major subcontractors; and other concerned parties (i.e. Illinois Environmental Protection Agency [IEPA]). All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

   a. Tentative construction schedule.
   b. Phasing.
   c. Critical Work sequencing.
   d. Submittal procedures.
   e. Preparation of Record Documents.
   f. Use of the premises.
   g. Responsibility for temporary facilities and controls.
   h. Office, Work and storage areas.

i. Equipment deliveries and priorities.
j. First aid.
k. Security.
m. Working hours.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01300

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The Contractor shall comply with all laws, rules and regulations governing the Work.

1. When Contractor observes that contract documents are at variance with specified codes, notify Engineer in writing immediately. Engineer will process changes in accord with General Conditions.
2. When Contractor performs any portion of the Work knowing or having reason to know that part of the Work is contrary to such laws, rules and regulations and fails to so notify the Engineer, Contractor shall pay all costs arising there from. However, it will not be the Contractor's primary responsibility to make certain that the contract documents are in accord with such laws, rules and regulations.

1.2 DEFINITIONS AND ABBREVIATIONS

A. Definitions

1. Dates: Reference Codes, Regulations and Standards are the current at date of bidding documents unless otherwise specified.
2. Codes: Codes are rules, regulations or statutory requirements of government agencies.
3. Standards: Standards are requirements set by authorities, custom or general consent and established as accepted criteria.

B. Abbreviations:

1.	AGCI	Associated General Contractors in Illinois.
2.	ANSI	American National Standards Institute.
3.	ASME	American Society of Mechanical Engineers.
4.	ASTM	American Society for Testing and Materials.
5.	BOCA	Building Officials & Code Administrators.
6.	CPSC	Consumer Product Safety Commission.
7.	IDOL	Illinois Department of Labor.
8.	IDOT	Illinois Department of Transportation.
9.	IDPH	Illinois Department of Public Health.
10.	IEPA	Illinois Environmental Protection Agency.
11.	UBC	Uniform Building Code.

12. UL Underwriters Laboratories, Inc.
13. USEPA U.S. Environmental Protection Agency.

1.3 REGULATORY REQUIREMENTS

A. Contractor is to obtain all permits, inspections, approvals, certificates, and pay all fees required by law. Conform to all laws, ordinances, rules and regulations applicable to the location of the Project.

B. Governing Regulations

1. Execute and observe all work in accordance with all local, state and federal codes, rules and regulations applicable to the project as a minimum, but if the plans and/or specifications call for exceeding these requirements, the greater requirements shall be followed.

C. Industry Standards: The industry standards applicable to the Work are indicated in appropriate individual sections of these specifications, either by their name and the names of the trade associations, government agencies or other producers of standards, or by well-recognized abbreviations thereof. Refer questions on the meaning of abbreviated designations to the Engineer for clarification before proceeding with Work affected thereby.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01310

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDE

A. Contractor: Submit schedule to Engineer at preconstruction meeting, maintain, coordinate and distribute schedule.

B. Coordination

1. Coordinate schedules with subcontractors.
2. Contractor will resolve conflicts among schedules of any of their subcontractors.

1.2 CONTENT OF SCHEDULES

A. Indicate complete sequence of construction by activity.

1. Shop drawings and product data: In accordance with 01330.

a. Submittal dates.
b. Dates when reviewed copies will be required.

2. Product procurement date, fabrication time and delivery dates.
3. Dates for beginning and completion of each element of construction.

B. Define critical portions of entire schedule.

1.3 SUBMITTALS

A. Submit initial schedule within seven business days after date of preconstruction meeting.

1. Engineer will review schedules and return reviewed copy within ten business days of receipt.
2. When directed, resubmit within five business days after return of reviewed copy.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 0132

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor's responsibility for errors and omissions in the submittal process shall not be relieved by the Engineer's review. The review is intended to be provided as a courtesy to the Contractor. It is NOT to be considered as a means of relieving the Contractor of any contractual requirements outlined in the Contract Documents.

1.2 DEFINITIONS

A. Shop drawings: Shop drawings are original drawings prepared by Contractor, subcontractor, supplier or distributor, which illustrate some portion of the Work, showing fabrication, layout, setting or erection details;

1. Prepared by qualified detailer.
2. Identify details by reference to sheet and detail numbers shown on contract drawings.
3. Maximum sheet size: 36" x 42".

B. Product data

1. Manufacturer's standard schematic drawings, edited to fit this product.
2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.

1.3 SCHEDULE OF SUBMITTALS

A. Coordinate preparation and processing of submittals with performance of construction activities:

1. Allow at least 7 calendar days for review by the Engineer for each submittal or resubmittal.
2. No claim for delay will be granted to the Contractor when the delay is caused by his failure to make submittals in a timely manner and in accordance with the accepted Submittal Schedule.

3. Allow adequate time beyond the required review time for processing and distribution of each submittal or resubmittal.

1.4 SUBMITTAL PROCEDURES

A. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Engineer's review and approval markings and action taken by Engineer.
3. Include the following information on label for processing and recording action taken:

a. Project Name.
b. Date.
c. Name and address of Engineer.
d. Name and address of Contractor.
e. Name and address of supplier.
f. Name of manufacturer.
g. Unique identifier, including revision number.
h. Number and title of appropriate Specification Section.
i. Drawing number and detail references, as appropriate.

B. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

C. Number of copies: Submit number of copies of shop drawings and product data that Contractor requires for distribution PLUS three (3) copies which will be retained by Engineer.

1.5 RESUBMISSION REQUIREMENTS

A. Resubmit all shop drawings and product data as requested by Engineer.

B. Make all resubmittals within ten business days after date of Engineer's previous review.

1.6 CONTRACTOR'S RESPONSIBILITIES

A. Review shop drawings and product data prior to submission to the next level of authority.

B. Verify:

1. Field dimensions.
2. Field construction criteria.
3. Catalog numbers and similar data.

C. Coordinate each submittal with requirements of:

1. The Work.
2. The Contract documents.
3. The work of other contractors.

1.7 ENGINEER'S DUTIES

A. Review submittals within 10 business days.

B. Review for:

1. Design concept of project.
2. Compliance with Contract documents.

C. Review all requests for proposed deviations. Obtain Performing Party's concurrence and respond to Contractor's request.

D. Review of separate item does not constitute review of an assembly in which item functions.

E. Affix stamp, date and initials or signature certifying to review of submittal and with instructions for Contractor response.

F. Return submittals to sender for response or distribution.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01330

PART 1 - GENERAL

1.1 DESCRIPTION

This Section describes the requirements for quality control.

1.2 ENGINEER'S DUTIES AND RESPONSIBILITIES

The Engineer and the Performing Party have the right, but not the duty, to monitor and review all Work performed by the Contractor to insure performance of the Work to the contract drawings and specifications. All Work shall be subject to observation or test by the Engineer and the Performing Party at all reasonable times and at all places prior to acceptance. Any such observation or test is for the sole benefit of the Performing Party and shall not relieve the Contractor of responsibility for providing quality control measures to assure that the Work strictly complies with the contract requirements.

No observation or test by the Performing Party or Engineer shall be construed as constituting or implying acceptance.

1.3 CONTRACTOR'S DUTIES AND RESPONSIBILITIES

A. The Contractor is responsible for the quality of the Work performed under this contract as well as the quality of the material, equipment and supplies furnished by him to be incorporated into the Work.

B. The Contractor shall cooperate with any of the Performing Party's or Engineer's material testing laboratories to perform testing of materials as required by the contract drawings and specifications, Construction Manager or Engineer.

C. The Contractor shall perform an inspection (upon receipt at the Site) of all materials, equipment and supplies. Items which are damaged or not in conformance with the respective submittals, quality standards, contract drawings and specifications will be identified and segregated from accepted items. Items thus identified shall not be incorporated into the Work until corrective action acceptable to the Engineer/Performing Party is completed. Items determined unsalvageable will be removed from the Site.

D. Manufacturer's Instruction: Comply with instructions in full detail, including each step in sequence, except where more stringent

requirements are indicated in the contract documents. Should instructions conflict with contract documents, request clarification from Engineer before proceeding.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION01400

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide temporary services and facilities ready for use when first needed to avoid delay in the Work. Maintain, expand and modify as needed. Do not remove until no longer needed.

B. Use Charges: Usage charges for temporary services or facilities are not chargeable to the Performing Party or Engineer.

C. Regulations: Comply with requirements of local laws and regulations governing construction and conform to local industry standards in the installation and maintenance of temporary services and facilities.

1.2 COLLECTION AND DISPOSAL OF WASTES

A. Establish a system for daily collection and disposal of waste materials. Enforce requirements strictly. Handle waste materials that are hazardous, dangerous, or unsanitary separately from other waste by containerizing. Dispose of waste material in a lawful manner.

1. Burying waste materials on the Site, with the exception of materials specified in the drawings and specifications will not be permitted.
2. Burning of waste materials on the Site or washing waste material down sewers will not be permitted.

1.3 TERMINATION AND REMOVAL

Remove each temporary service and facility promptly when need has ended, but no later than substantial completion.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01500

PART 1 - GENERAL

1.1 SUMMARY

This section includes requirements for providing Site security, protection of equipment, cleaning and safety during construction of this project.

1.2 SECURITY

A. Provide protection for materials, tools and equipment being employed on the Site, including the tools of workers. The Performing Party shall not be held to have incurred any liability for loss of, and damage to, materials, tools and equipment for the Contractor or those employed by him by contract or otherwise.

B. The Contractor shall employ such security as he may deem necessary to properly protect and safeguard the Work. The Performing Party shall not in any way be liable or responsible for the damage or loss to the Work due to trespass or theft.

1.3 PROTECTION

A. Continuously maintain protection as necessary to protect the Work, as a whole or in part, and to protect adjacent property and improvements from accidents, injuries or damage.

B. Properly protect the Work with lights, guard rails, temporary covers, and/or barricades. Provide additional forms of protection which may be necessary under existing circumstances.

C. Provide and maintain in good condition all protective measures required to adequately protect the public from hazards resulting from the Work and to exclude unauthorized persons from the Work. When regulated by Building Codes or other authority, such legal requirements for protection shall be considered as minimum requirements; be responsible for the protection in excess of such minimum requirements as required.

1.4 CONTROL OF SITE

The Contractor shall ensure that no alcohol, firearm, weapon or controlled substance enters or is used at the project Site. The Contractor shall

immediately remove the employee from the Site if found in violation of this provision.

1.5 SAFETY PROGRAM

A. The Contractor shall be required to comply with their Safety Program, SECOR's Site-Specific Health & Safety Plan, and all applicable federal, state and local regulations, codes, rules, laws, and ordinances.

B. Review of the Safety Program shall not relieve the Contractor of any responsibility for complying with all applicable safety regulations. Nor by reviewing the Safety Program, will the Engineer assume any of the Contractor's responsibilities for compliance with state safety regulations.

C. It is essential that each contractor and subcontractor implement an effective and vigorous Safety and Health and Fire Prevention Program to cover his portion of the Work. It shall be understood that the full responsibility for providing a safe place to work with respect to his portion of the Work rests with each individual contractor.

1.6 SAFETY REQUIREMENTS

A. Standards: Maintain the Project in accordance with federal, state and local safety and insurance standards.

B. Hazards Control

1. Store volatile wastes in covered metal containers and remove from premises daily.
2. Prevent accumulation of wastes that create hazardous conditions.
3. Provide adequate ventilation during the use of volatile substances.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01540

PART 1 - GENERAL

1.1 SUMMARY

This section includes requirements for requesting and providing substitute products and for delivery, storage and handling of products at the Site.

1.2 PROCEDURAL REQUIREMENTS

Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of Work. Where it is not possible to do so, match separate procurements as closely as possible. To the extent that the product selection process is under the Contractor's control, provide products that are compatible with previously selected products.

1.3 PRODUCT SELECTION LIMITATIONS

A. Product Selections: Comply with the following requirements in the selection of products, materials and equipment:

1. Single Product Name: Where only a single product or manufacturer is named, provide the product, unless it is not available, is incompatible with existing Work, or does not comply with specified requirements or governing regulations.
2. Two or More Products Named: Where two or more products or manufacturers are named, the selection is at the Contractor's option, provided the product selected complies with the specified requirements.
3. "Or Equal" Provisions: Where products or manufacturers are specified by name accompanied by the term "or equal", provide either the product named or comply with the requirements for gaining approval of "substitutions" for the use of an unnamed product prior to bid.
4. Compliance with Standards: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting any product that complies with specified requirements, provided no product names are indicated.
5. Performance Requirements: Where the specifications require compliance with indicated performance requirements, the Contractor has the option of selecting any product that complies

with specific performance requirements, provided no product names are indicated.

6. Visual Requirements: Where the specifications indicate that a product is to be selected from the manufacturer's standard options, without naming the manufacturer, the Engineer has the option of making the selection, after the Contractor has determined or selected the manufacturer.

1.4 SUBSTITUTIONS

A. Contractor's requests for substitutions must be submitted to the Engineer a minimum of one week before the date and time of bids.

B. Conditions: The Contractor's requests for substitutions will be considered when they are reasonable, timely, fully documented and when they qualify under one or more of the following circumstances:

1. The proposed substitution is related to an "or equal" or similar provision in the contract documents.
2. The required product cannot be supplied in time for compliance with schedule requirements.
3. The required product is not acceptable to the governing authorities.
4. The required product cannot be properly coordinated with other materials in the Work or cannot be warranted or insured as specified.
5. The proposed substitution will offer a substantial advantage to the Performing Party after deducting offsetting disadvantages, including delays, additional compensation to the Engineer for redesign, evaluation and other necessary services and similar considerations.

C. Submittals: Include the following information, as appropriate, in each request for substitution:

1. Provide complete product documentation, including product data and samples, where appropriate.
2. Provide detailed performance comparisons and evaluation, including testing laboratory reports where applicable.
3. Provide coordination information indicating the effect of the substitution on other work and the schedule.
4. Provide cost information for the proposed change order.
5. Provide the Contractor's general certification of the recommended substitution.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 1630

PART 1 - GENERAL

1.1 CLOSEOUT PROCEDURES

Closeout procedures shall consist of two parts:

A. Preparation of Closeout Manuals.

B. Preparation of a Punch List of unfinished items.

1.2 PROJECT CLOSEOUT MANUAL

A. Responsibility: Contractor shall assemble Closeout Manuals.

B. Quantity: Contractor shall provide two copies of the Closeout Manual. Manuals shall be shipped to the Engineer for review. If the Manuals are complete, the Engineer will retain one copy and forward one copy to the Performing Party.

C. Manual Contents:

1. Contractor as-built drawings.
2. Copy of the Punch List, signed off by the Contractor indicating that all items have been completed.
3. Copies of all warranties. Warranties shall indicate a start date.
4. Copies of all permits.
5. Copies of laboratory or other test reports.

1.3 PUNCH LIST PROCEDURES

A. When the Contractor believes construction is complete, he will arrange a Site walk-through with the Engineer.

B. The Engineer will generate a Punch List of items that are found to be incomplete or have not been completed according to the drawings and specifications. The Engineer will generate and transmit the Punch List to the Contractor within five working days of the walk-through.

C. Contractor shall complete all Punch List items within two weeks of receiving the list. When all items have been completed, Contractor will provide the Engineer with the Punch List with each item signed off, indicating all items are complete and the project is ready for final acceptance review.

D. Contractor and Engineer will make a final walk-through of Site to verify the completion of Punch List items. At walk-through or prior to it, Contractor will provide Closeout Manuals to Engineer.

E. If the Closeout Manuals are complete and the Engineer determines all Punch List items are complete, the Engineer will provide a letter to the Performing Party recommending final acceptance and final payment to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01700

PART 1 - GENERAL

1.1 GENERAL

All warranties shall commence upon final acceptance.

1.2 STANDARD PRODUCT WARRANTIES

A. Provide preprinted written warranties published by individual manufacturers for particular products and specifically endorsed by the manufacturer to the Performing Party.

B. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products.

1.3 RELATED DAMAGES AND LOSSES

A. When correcting warranted Work that has failed, Contractor shall remove and replace at no extra cost Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. When Work covered by a warranty has failed and has been corrected by replacement or repair, Contractor shall reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Upon determination that Work covered by a warranty has failed, Contractor shall replace or repair the Work to an acceptable condition complying with requirements of Contract Documents.

1.4 PERFORMING PARTY'S RECOURSE

Written warranties made to the Performing Party are in addition to implied warranties and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Performing Party can enforce such other duties, obligations, rights or remedies.

1.5 WARRANTY REQUIREMENTS

A. Submit written warranties to the Engineer prior to completion.

B. When a designated portion of the Work is completed and accepted by the Performing Party, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within 15 days of completion of that designated portion of the Work.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 01740

PART 1 - GENERAL

1.1 SUMMARY

Site clearing will be performed by others.

1.2 DEFINITIONS

A. Site Clearing. Clearing shall consist of the removal and disposal or burial of all obstructions or debris located above the sub-base (in accordance with the USEPA Record of Decision), as shown on the drawings.

1.3 CONSTRUCTION REQUIREMENTS

A. Removal of obstructions and other materials as required during construction of items of Work under this contract.

PART 2 - PRODUCTS (NOT USED)

PART3 - EXECUTION (NOT USED)

END OF SECTION 02230

PART 1 - GENERAL

1.1 SUMMARY

Section Includes: Excavating, filling, grading, and other related Work to prepare the Site.

1.2 DEFINITIONS

A. Unclassified Excavation: Shall consist of the material excavation and placement regardless of its nature.

B. Common Excavation: Removal of materials which can be excavated using a rear-mounted, heavy-duty, single-tooth ripping attachment mounted on a crawler tractor with a power rating of 145 kW (195 net horsepower) or less shall be considered common excavation.

C. Muck Excavation: Shall consist of the removal and disposal of deposits of saturated or unsaturated mixtures of soils and organic matter not suitable for foundation material regardless of moisture content.

D. Fill Material: Shall be mineral soil free from peat, frozen material, brush, trees, roots over 2 inches in diameter and rocks over 6 inches in greatest diameter obtained from Site during excavation.

1.3 QUALITY ASSURANCE

A. Failure Criteria: Not limited to the following:

1. Formation of pools of moisture where positive drainage is indicated on the drawings.
2. Settlement of fill.

1.4 PROJECT/SITE CONDITIONS

A. Environmental Conditions: Do not attempt to grade frozen or saturated material. Water dry material to prevent dust.

PART 2 - PRODUCTS (NOT USED)

PART 3: EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify the grade elevations existing on the Site. Notify the Engineer immediately when adjustments are required to provide finish elevations indicated.

3.2 PREPARATION

A. Clearing: Section 02230 - Site Clearing.

B. Scarifying: Sod and vegetation shall be removed from the surface upon which the fill shall be placed. No fill materials shall be placed upon unapproved surface.

3.3 INSTALLATION

A. Grades: When not otherwise indicated shall be level, or uniform slopes between points where elevations are given, or between such points and existing finished grades. Abrupt change in slopes shall be rounded.

B. Compaction Methods: Fill material shall be spread over the full area of the cross section of the fill to a maximum layer thickness of 6 inches. Compact according to Section 02315 - Excavation and Fill before the next layer is spread. During placing and compacting of the fill material, the optimum moisture content shall be maintained by wetting or drying as required.

C. Frozen Material: Fill shall not be placed when either the material or the surface on which it is to be placed is frozen.

3.4 FIELD QUALITY CONTROL

A. Compaction: Fill material shall be compacted to a minimum density of 90 percent Standard Proctor.

END OF SECTION 02310

PART 1: GENERAL

1.1 SUMMARY

A. Section Includes: Excavation, borrow excavation, embankment construction, placement, and disposal of materials as shown on the drawings.

B. Related Sections

Summary of Work - Section 01100
Site Clearing - Section 02230

1.2 PROJECT/SITE CONDITIONS

A. Excess Material: Usable excess material excavated shall be used before the use of borrow is allowed.

B. Fencing: If fencing is removed to facilitate construction, replace the fencing as soon as possible to the condition prior to the project.

Site security shall be maintained at all times.

PART 2: PRODUCTS

2.1 MATERIALS

A. Fill Material: Shall be obtained from approved borrow areas. Material from Site excavation areas shall be used in fill areas unless it contains ice or frozen earth, debris, high moisture content, or is specified in other sections to be replaced. Materials removed in clearing and grubbing shall not be used.

PART 3: EXECUTION

3.1 PREPARATION

A. Clearing and Grubbing: The area to be excavated, and the surface area to be covered by fill material, shall be thoroughly cleared and stripped of vegetative matter, brush, trees, stumps, roots, loose rocks, and other objectionable materials. Dispose of debris in accordance with Specifications (reference Section 01500).

B. Preparation for Grading: Prior to beginning fill operations in an area, necessary clearing and grubbing in that area shall have been completed and accepted by the Engineer. No materials shall be placed upon an unapproved surface.

3.2 INSTALLATION

A. Excavation: Excavate where shown on the drawings and typical sections, unless staked otherwise. Excavate on a straight grade between the control points shown on the drawings unless staked otherwise. Existing structures which are disturbed or damaged by construction activity shall be reset, repaired, or replaced at the Contractor's expense.

B. Subgrade Compaction: In areas where earth fill, or granular embankments are to be constructed and in areas where excavation exposes the subgrade surface the subgrade shall be compacted as specified before embankment construction begins.

C. Disposal of Materials: Excess and unsuitable material shall be disposed of.

D. Frozen Material: Shall not be placed, nor be placed upon a frozen surface.

3.3 FIELD QUALITY CONTROL

A. Testing: Testing will be performed by others. The Engineer will make arrangements for a certified independent testing laboratory to perform the required testing, recording, and distributing of the results. Contractor shall furnish necessary equipment, labor, and materials to allow the laboratory personnel to conduct the testing.

B. Moisture Content: During placing and compacting of fill material, the optimum moisture content (-4 percent to +2 percent) as determined by AASHTO T 217 or AASHTO T 239, unless otherwise approved, shall be maintained by wetting or drying.

C. Compaction: The fill material shall be compacted to a minimum density of 90 percent of the maximum dry density as determined by AASHTO T 99, Method C.

END OF SECTION 02315

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Furnishing, placing and compacting aggregate on the FML and on slopes, as shown on the drawings.

1.2 SUBMITTALS

A. General: Submittals shall be according to Section 01330 - Submittal Procedures.

B. Test Data: Submit three copies of test data for the Contractor-furnished aggregate to be used on this project.

C. Certificates of Conformance: Submit three copies of written certification from the supplier of the Contractor-furnished aggregate to be used on this project that it conforms to the requirements of this specification section.

1.3 DELIVERY, STORAGE AND HANDLING

A. Delivery: Mitigate spillage or damage that occurs during delivery.

1.4 PROJECT/SITE CONDITIONS

A. Excess Materials: Shall be removed from the Site.

B. Borrow Pits: Properly process the material from the borrow pits to meet the requirements of these specifications.

1.5 WARRANTY

A. Requirements: Aggregate base found to be defective within 12 months after Work completion, shall be replaced at the Contractor's expense. Overlaying material that must be replaced because of defective base material shall also be replaced at the Contractor's expense.

PART 2 - PRODUCTS

2.1 MATERIALS

Materials shall meet the following requirements:

A. Description. The coarse aggregate shall be pit run gravel, gravel, crushed gravel, novaculite or crushed stone.

The granular material may be produced by blending aggregates from more than one source, provided the method of blending results in a uniform product. The components of a blend need not be of the same kind of material. The source of material shall not be changed during the progress of the Work without written permission from the Engineer. Where a natural aggregate is deficient in fines, the material added to make up deficiencies shall be a material approved by the Engineer.

B. Quality. The coarse aggregate shall be Class D Quality or better.

C. Gradation. The coarse aggregate gradation shall be used as follows:

For the 12" of fill over the FML, Gradation CA 16 or CA 17 shall be used. Aggregate used to stabilize slopes, Gradation CA 1.

2.2 CONSTRUCTION EQUIPMENT

A. Rollers.

No roller shall be used that has in any way been thrown out of its original balance by the application of attachments not approved by the Engineer. All bearings shall be tight.

1. Tamping Rollers. The roller shall have a minimum weight of 90 lb/in. width of drum, and each individual tamper shall develop a compression of not less than 100 psi of its tamping face area. The width of the tamping roller shall be not less than 8 ft, and it shall be constructed in two or more sections in such a manner that each section is free to oscillate or move independently. It shall be equipped with cleaning teeth at the rear.

2. Pneumatic-Tired Rollers. The roller shall consist of not less than nine pneumatic tires revolving on two axles. The tires on the front and rear wheels shall be staggered so that they will cover the entire area over which the roller travels. Under working conditions, the roller shall develop a compression of not less than 225 lb/in. width of tire tread.

3. Three Wheel Rollers. The rear wheels of three wheel rollers may be crowned at the rate of not more than 1/16 in. in 20 in. and shall be propelled with a differential gear. The front wheel

shall be divided into at least two sections, shall show no noticeable crown, and shall overlap the compression area of each rear wheel by not less than 1 1/2 in. The weight of the roller shall meet requirements of the specific item of Work being constructed.

4. Tandem Rollers. The Contractor shall provide means for determining the weight of the roller as distributed on each axle. Ballast shall be included in determining the weight. The rear wheel may be crowned at the rate of not more than 3/16 in. in 4 1/2 ft. The front wheel shall be divided into at least two sections and shall show no noticeable crown. The weight of the roller shall meet requirements of the specific item of Work being constructed.

B. Spreaders.

1. The aggregate spreader used in placing aggregates in layers of 1 to 12 in. shall be of a design approved by the Engineer.

2. The aggregate spreader shall contain a strike off plate capable of being adjusted so as to place the material in uniform layers from 1 to 12 in. in depth. It shall be equipped with two end gates or cut off plates, so that the aggregates may be spread in widths varying up to lane width.

3. The aggregate spreader used in spreading aggregate for surface treatments, keystone coat and seal coat shall be of a mechanical type approved by the Engineer. It shall distribute the aggregate uniformly, and shall be capable of being adjusted so that the spreading rate of the aggregate will not vary more than 2 lb/sq yd.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: The material shall be placed on the prepared surface and compacted in layers of the thickness shown on the drawings. When more than one layer is required, each layer shall be shaped and compacted before the succeeding layer is placed.

1. Placing shall be from vehicles equipped to distribute the material in a continuous uniform layer or windrow. The layer or windrow shall be of such size that when spread and compacted, the finished layer shall have the required thickness.

2. When hauling is done over previously placed material, hauling equipment shall be routed uniformly as possible over the entire surface of the constructed layers.

B. Spreading: When uniformly mixed, the mixture shall be spread smoothly for compaction to the required thickness.

C. Compacting: Immediately following final spreading and smoothing, each layer shall be compacted to the full width by approved compaction equipment. Irregularities or depressions that develop shall be corrected by loosening the material at these places. Add or remove material until the surface is smooth and uniform.

D. Watering: Provide water and watering equipment to control dust and obtain required compaction.

3.2 CONSTRUCTION REQUIREMENTS

A. Subgrade.

1. The entire subgrade shall be compacted to not less than 90 percent of the standard laboratory density. All holes, ruts, soft places and other defects shall be corrected. In no case shall the surface course, base course, gutter, curb, or combination curb and gutter be placed on soft or unstable material, or over areas that are not drained in a manner satisfactory to the Engineer. If the subgrade is dusty or muddy, operations shall be delayed until it is in a condition satisfactory to the Engineer.

2. The subgrade shall be constructed so that after being compacted, it will conform to the grade, and cross section shown on the plans, and as required by the Engineer. Surplus excavated material resulting from grading and shaping the subgrade shall be disposed of as directed by the Engineer.

3. Where rolling of the subgrade is required, any areas, which are inaccessible to a roller, shall be compacted by either a mechanical or hand tamper meeting the approval of the Engineer.

4. Equipment of such weight, or used in such a way as to cause a rut in the finished subgrade of 2 in. or more in depth, shall be removed from the Work, or the rutting otherwise prevented.

B. Drainage. The subgrade shall be kept drained during the placing and compacting of the surface, base course, or subbase. If berms of earth

are deposited along the area upon which the subbase, base, or surface course is being placed, provision shall be made for surface drainage by cutting lateral ditches through the berms of earth.

C. Maintenance. The finished subgrade shall be maintained in a smooth and compacted condition until the subbase, base course and surface course is placed.

END OF SECTION 02722

PART 1 - GENERAL

1.1 SUMMARY

Section Includes: This Work shall consist of constructing a full-depth bituminous concrete pavement structure comprised of one or more bituminous concrete binder courses and a bituminous concrete surface course on a prepared subgrade.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Fine Aggregate for Bituminous Mixtures. The aggregate shall conform to the following requirements:

1. Description. Fine aggregate for bituminous mixtures shall consist of sand, stone sand, slag sand, steel slag, or chats.
2. Quality. The fine aggregate for bituminous mixtures shall be Class B Quality or better.
3. Source of Supply. All sources of supply shall be approved by the Engineer. The Contractor shall submit to the Engineer a statement giving the sources of fine aggregate. Only fine aggregates from these sources shall be used on the job unless approval in writing is obtained from the Engineer.

B. Coarse Aggregate for Bituminous Courses.

1. Description. The coarse aggregate for all bituminous mixtures shall be crushed gravel, crushed stone (other than limestone), crushed sandstone, crushed slag, or chats.
2. Quality. Coarse aggregate shall be Class C quality or better.
3. Sources of Supply. All sources of supply shall be approved by the Engineer. The Contractor shall submit to the Engineer a statement giving the sources of the coarse aggregate. Only coarse aggregates from these sources shall be used on the job unless approval in writing is obtained from the Engineer.

C. Mineral Filler in Bituminous Mixtures.

1, The fly ash shall meet the requirements of AASHTO M 295, Class C, or Class F except if dampened for the purpose of transportation, the loss-on-ignition shall not exceed 12 percent.

2.2 BITUMINOUS MATERIALS

A. Bituminous materials shall include asphalt cements, asphalt fillers, emulsified asphalts, rapid curing liquid asphalts, medium curing liquid asphalts, slow curing liquid asphalts, and road oils. All bituminous materials used in a given construction shall be uniform in character, appearance and consistency.

B. Sources of Supply. All sources of supply shall be approved by the Engineer before delivery is started. If sources previously accepted are found to be unacceptable to the Engineer, the Contractor will be required to furnish materials from other approved sources.

The Contractor shall submit to the Engineer a statement giving the sources of the bituminous materials he/she proposes to use. Only bituminous materials from these sources shall be used on the Work unless approval, in writing, is obtained from the Engineer.

C. Medium Curing Liquid Asphalts. Medium curing liquid asphalts shall be free from water, show no separation on standing, and shall conform to the requirements listed in Article 1009.09 of the Illinois Department of Transportation (IDOT) Standard Specifications for Road and Bridge Construction.

D. Slow Curing Liquid Asphalts. Slow curing liquid asphalts will be accepted according to the latest revision of the Bureau of Materials and Physical Research Policy Memorandum, "Cut-back Asphalt and Road Oil Acceptance Procedure". These materials shall be slow curing liquid asphalts produced by the distillation of petroleum. The liquid asphalts shall be residues, distillates or residues fluxed to the desired consistency with petroleum distillates. Each shipment of liquid asphalt shall be uniform in appearance and consistency. All grades shall be free from water and shall not foam when heated to 107 °C (225 °F) The residues of specified penetration shall be smooth and homogeneous in appearance. These materials shall conform to the requirements listed in Article 1009.10 of IDOT Standard Specifications for Road and Bridge Construction.

PART 3 - EXECUTION

2.1 CONSTRUCTION REQUIREMENTS

A. Subgrade. The subgrade shall be prepared according to Section 02722

C. Placing. Placing of bituminous mixtures shall be according to the following:

1. The bituminous mixtures shall be delivered at a temperature of 250 °F - 350 °F. The bituminous mixture shall be placed with a spreading and finishing machine to the typical section and grade shown on the plans or as established by the Engineer. On areas where irregularities, inaccessibility, or unavoidable objects make the use of mechanical spreading and finishing impractical, as determined by the Engineer, the mixture may be spread, raked and luted by hand.
2. Placing the bituminous mixtures shall be away from a transverse joint. The binder course shall be kept clean until covered with the surface course. Any foreign material on the surface of the binder course shall be removed to the satisfaction of the Engineer before the surface course is placed.
3. Intermingling of different mixes at any one paver will not be permitted.
4. A stringline shall be used as a guide for the finishing machine in order to maintain a uniform edge alignment; if any other method is proposed, it shall meet the approval of the Engineer before being used. Irregularities in the alignment of the outside edges and along the longitudinal joint shall be corrected by adding or removing bituminous mixtures before the edges are rolled. Excess bituminous mixtures deposited on the existing base, binder course or surface course outside the limits of the lane being laid shall be removed immediately and disposed of as directed by the Engineer.
8. A straightedge at least 4 ft in length and equipped with a carpenter's level shall be available at the spreading and finishing machine to check the surface of the bituminous mixture for transverse slope and longitudinal surface variations.

D. Compaction

1. Rolling. Immediately after each lift of level binder, binder, or surface course mixture is placed, each lift shall be compacted. Rolling equipment shall meet the requirements listed below:

a. Vibratory roller, static mode, minimum 2.2 kg/mm (125 lb/in.) of roller width. Max. speed = 5 km/h (3 mph) = 80

m/min (264 ft/min). If the vibratory roller does not eliminate roller marks, its use shall be discontinued and a tandem roller adequately ballasted to remove roller marks shall be used.

b. Vibratory roller, dynamic mode, operated at a speed to produce not less than 30 impacts/m (10 impacts/ft).

c. Pneumatic-tired roller, max. speed 5.5 km/h (3 1/2 mph) = 92 m/min (308 ft/min) Minimum tire pressure 550 kPa (80 psi). Pneumatic-tired roller shall be equipped with heat retention shields. The self-propelled pneumatic-tired roller shall develop a compression of not less than 53 N (300 lb) nor more than 88 N/mm (500 lb/in.) per mm (per in.) of width of the tire tread in contact with the bituminous surface.

2. The compacted thickness of the initial lift of binder course shall be a minimum 4 in. Succeeding lifts shall be not more than 4 in. thick when compacted except that the top lift of binder shall have a minimum 2 in. thick compacted layer. If a vibrating roller is used for breakdown, the compacted lift thickness of lower layers of binder may be increased to 6 in., provided the required density is obtained.

3. Each compacted lift of bituminous concrete mixture shall be thoroughly clean of all dirt, dust, and foreign material to the satisfaction of the Engineer before the next lift is placed. All cleaning operations such as blowing, power brooming, washing, blading or milling necessary to thoroughly clean the bituminous surfaces shall be at the Contractor's expense.

E. Hauling on the Partially Completed Pavement.

1. Trucks will be permitted on partially completed segments of bituminous concrete pavement only to deliver bituminous mixture to the paver except that hauling on partially completed segments will be permitted if the thickness of binder in-place is greater than 4 in., the last paving lift has cooled a minimum of 24 hours and the air temperature is below 85 °F. When hauling is allowed, the load limit restrictions given in the following table will be strictly enforced. In addition, a traffic pattern shall be established that will vary across the width of the pavement and "tracking" of vehicles one directly behind the other will not be allowed at any time.

F. Tolerance in Thickness

1. Determination of pavement thickness will be based on cores taken from a unit of the pavement having a surface area equal to or greater than 500 sq yd.
2. Determination of pavement thickness may be made from edge of pavement measurements or from before and after cross section measurements, as determined by the Engineer.

END OF SECTION 02743